

Math Challenge Problem

for late October, 2011

Leonardo's Nim



Here is a game you can play with a pile of stones and a friend. Whoever plays first takes as many stones from the pile as he or she likes, but not all of them. After this first move, players alternate, taking up to twice as many stones as their opponent just took. The winner is the player to take the last stone or stones.

For example, if you start with 12 stones, player 1 might take 3 (leaving 9). Then player 2 can take up to 6, but probably shouldn't - doing so will leave just 3, and player 1 can take all of them on her next turn. So say player 2 takes just 2 stones. Player 1 can then take up to 4 of the remaining six stones. And so on.

The Challenge: If you and your friend start with 100 stones, how many should you take on your first turn to guarantee an eventual win?

Submit solutions to Ross 2239 or to oscar.levin@unco.edu by *Friday, November 4th*.
The best solution will be posted on the Math Challenge Problem webpage.

Look for a new Challenge Problem in early November.